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Cricoid abscess presenting as progressive dyspnea

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ABSTRACT

Laryngeal abscess, especially in the posterior larynx and cricoid region, is a rare entity with potential for high morbidity and mortality. The most common etiologies for such abscesses include trauma, prolonged intubation, and supraglottic infection. This case report describes a patient with cricoid abscess of unknown etiology but with a remote history of trauma and intubation. He initially presented with progressive dyspnea and hoarseness, with no signs or symptoms consistent with infection. The report describes airway management techniques and a unique approach to draining the posterior cricoid fluid collection.

KEYWORDS Cricoid abscess; intubation; laryngeal abscess; laryngeal trauma; stridor

The cricoid cartilage is a major laryngeal structure that preserves airway patency and provides attachment points for crucial muscles and ligaments.[1] Disruption of the cricoid may interfere with normal respiration and lead to death. Fortunately, laryngeal abscess is uncommon, with even fewer occurrences in the cricoid.[2] In this case report, we describe the management of a patient with cricoid abscess of unknown etiology; however, 2 months prior, he sustained head and neck injuries secondary to a motorcycle accident.

CASE DESCRIPTION

A 19-year-old white man presented to the emergency department with progressive dyspnea, biphasic stridor, and hoarseness. He had been in a motorcycle accident 2 months earlier, requiring a surgical intensive care unit (SICU) stay with intubation and nasogastric tube placement, but had no other significant medical history. He received racemic epinephrine and steroids without significant improvement. Soft tissue neck x-ray demonstrated subglottic narrowing, and bedside flexible laryngoscopy revealed bilateral vocal fold immobility with a vocal fold abduction maximum opening angle of 12°, causing significant airway obstruction.

The patient was taken emergently to the operating room for airway management. He was preoxygenated with transnasal humidified rapid insufflation ventilatory exchange at 50 L/minute for 10 minutes prior to suspension laryngoscopy with a Dedo laryngoscope, which revealed a type IV posterior glottic stenosis. He was intubated with a 5.0 microlaryngoscopy endotracheal tube, and a tracheotomy was performed with placement of a 6.0 cuffed flexible Shiley tracheostomy tube. He was then placed back in suspension for steroid injection and dilation. There was no intraoperative evidence of a fluid collection at that time.

Postoperatively, he was transferred to the SICU for airway monitoring. On postoperative day 2, a modified barium swallow study obtained as part of a standard posttracheotomy evaluation revealed a soft tissue prominence between the trachea and cervical esophagus with associated mass effect. Computed tomography (CT) of the neck revealed glottic narrowing and a $2.7 \times 1.0 \times 2.2$ cm posterior laryngeal fluid collection at the level of the true vocal folds with possible fragmentation of the cricoid cartilage *(Figure 1)*. The patient was taken back to the operating room for repeat direct laryngoscopy. An area of posterior cricoid/glottic fullness was identified and aspirated using an 18-gauge needle via the cricothyroid membrane under direct visualization from above *(Figure 2a)*. The abscess cavity was then incised using a CO_2 laser (4 W, line pattern generator) fixed to a micromanipulator, followed by blunt/sharp dissection yielding additional purulence *(Figure 2b)*. Cricoarytenoid joints were injected with 0.5 mL of triamcinolone 40 mg/mL.

The aspirate culture was positive for normal mucosal flora, and he was discharged to home on a 10-day course of

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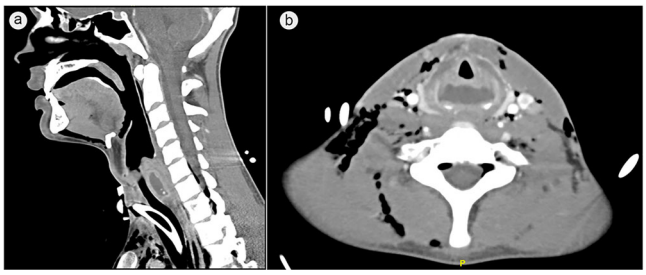

Figure 1. Soft tissue neck CT with contrast. **(a)** Sagittal and **(b)** axial images showing a 2.7 × 1.0 × 2.2 cm fluid collection posterior to the larynx at the glottic and subglottic level.

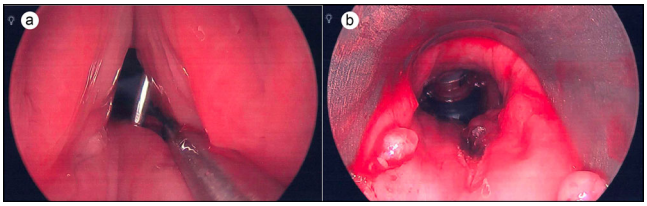

Figure 2. Direct laryngoscopy images demonstrating the surgical approach for incision and drainage. **(a)** External approach to the posterior cricoid abscess using an 18-gauge needle inserted through the cricothyroid membrane, resulting in aspiration of 4 mm of purulent fluid. **(b)** Final appearance after CO_2 laser incision and internal blunt/sharp dissection of the fluid pocket.

amoxicillin-clavulanic acid. At 1-week follow-up, he had no signs or symptoms of infection, was no longer stridulous, denied dyspnea and voice changes, and had increased vocal fold abduction to a maximum opening angle of 30°.

DISCUSSION

Cricoid abscess is the rarest form of laryngeal abscess but carries a high potential for morbidity and mortality.[3] In addition to obstructing the airway via mass effect, a cricoid abscess can also distort cartilaginous shape and attachments, interrupting normal vocal fold function.[1,4] The etiology of cricoid abscess is poorly understood given its limited occurrence,[5] but the leading theory is that mucosal damage can result in disrupted vascular supply or perichondritis, eventually leading to abscess formation.[3,4] This can occur secondarily to trauma, prolonged intubation, or nasogastric tube placement,[2–8] all of which were present in this patient's case. Other etiologies include radiotherapy,[6–8] immunosuppression,[2,9] and foreign body ingestion.[10] In this case, mucosal or cartilaginous injury may have occurred at the time of the initial collision, leading to gradual formation of an occult fluid collection, or secondary to hospital interventions.

Patients with a cricoid abscess are usually afebrile and tend to present with progressive hoarseness.[2,4,6,11] CT is useful for initial diagnosis to evaluate abscess size, cricoid integrity, and extent of airway involvement[4]; however, the importance of flexible laryngoscopy should be emphasized in patients with symptoms concerning for airway compromise, as it allows for direct visualization of mucosal injury and vocal fold function.[6]

There is a paucity of literature regarding optimal cricoid abscess management. Cited treatment modalities include incision and drainage with antibiotics,[4] tracheotomy for airway concerns,[5] and possible laryngectomy for persistent infections and laryngeal dysfunction.[7] In our case, the airway was secured with a tracheotomy before incision and drainage. Although uncommon, laryngeal abscess should be considered in the differential diagnoses for patients with progressive dyspnea. Both CT imaging and flexible laryngoscopy should be regular components of initial assessment, and treatment should consist of a combination of airway management, drainage, and appropriate antibiotic coverage.

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